

### ***Currently Pending Claims***

This listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently amended) ~~A compound~~ An isolated polypeptide of the structure or formula S-(L)<sub>n</sub>-B wherein:

(a) ~~S is an amino terminal signaling functional domain of PTH; S is selected from the group consisting of PTH(1-9) (AlaValSerGluIleGlnLeuMetHis) (SEQ ID NO: 1), PTH(1-5) (AlaValSerGluIle) (SEQ ID NO: 4) or PTH (1-11) (AlaValSerGluIleGlnLeuMetHisAsnLeu) (SEQ ID NO: 46);~~

(b) L is a glycine linker molecule present n times;

(c) n is ~~an integer greater than 15~~ to 10; and

(d) B is a carboxy terminal binding domain of PTH(1-34) or PTHrP(1-34), wherein said carboxy terminal binding domain binds to a PTH- receptor 1 molecule

wherein said ~~compound~~ polypeptide stimulates intracellular accumulation of cyclic cAMP; and

~~wherein (L)<sub>n</sub> is n repeats of the same amino acid.~~

2. (Canceled) ~~The compound of claim 1, wherein said compound is an isolated polypeptide.~~

3. canceled.

4. (Canceled) ~~The isolated polypeptide of claim 2, wherein S is selected from the group consisting of PTH(1-9) (AlaValSerGluIleGlnLeuMetHis) (SEQ ID NO: 1), PTH(1-5)~~

~~(AlaValSerGluIle) (SEQ ID NO: 4) or PTH (1-11) (AlaValSerGluIleGlnLeuMetHisAsnLeu) (SEQ ID NO: 46).~~

5. (Currently amended) The isolated polypeptide of claim ~~2~~ 1, wherein L is selected from the group consisting of Gly<sub>5</sub>, Gly<sub>7</sub> and Gly<sub>9</sub>.

6. (Currently amended) The isolated polypeptide of claim ~~2~~ 1, wherein B is selected from the group consisting of PTH(15-31) (LeuAsnSerMetGluArgValGluTrpLeuArgLysLysLeuGlnAspVal) (SEQ ID NO:2), PTH(17-31) (SerMetGluArgValGluTrpLeuArgLysLysLeuGlnAspVal) (SEQ ID NO:63), PTHrP (15-31) (IleGlnAspLeuArgArgArgPhePheLeuHisHisLeuIleAlaGluIle) (SEQ ID NO:8), and PTHrP(17-31) (AspLeuArgArgArgPhePheLeuHisHisLeuIleAlaGluIle) (SEQ ID NO:12).

7. (Currently amended) The An isolated polypeptide of claim ~~2~~ selected from the group consisting of: PG5 ~~[[:]]~~ AlaValSerGluIleGlnLeuMetHisGlyGlyGlyGlyGlyLeuAsnSerMetGluArg ValGluTrpLeuArgLysLysLeuGlnAspVal (SEQ ID NO:3), PG9: AlaValSerGluIleGlyGlyGlyGlyGlyGlyGlyGlyGlyGlyGlyLeuAsnSerMetGluArgValGluTrpLeuArgLysLysLeuGlnAspVal (SEQ ID NO:5), PG7: AlaValSerGluIleGlnLeuMetHisGlyGlyGlyGlyGlyGlyGlySerMetGlu ArgValGluTrpLeuArgLysLysLeuGlnAspVal (SEQ ID NO:6), PrPG5: AlaValSerGlu HisGln LeuLeuHisGlyGlyGlyGlyGlyIleGlnAspLeuArgArgArgPhePheLeuHisHisLeuIleAlaGluIle (SEQ ID NO:64), PrPG9: AlaValSerGluHisGlyGlyGlyGlyGlyGlyGlyGlyGlyGlyIleGlnAspLeuArgArgArgPhePheLeuHisHisLeuIleAlaGluIle (SEQ ID NO:65) and PrPG7: AlaValSer GluHisGlnLeuLeuHisGlyGlyGlyGlyGlyGlyGlyGlyAspLeuArgArgArgPhePheLeuHisHisLeuIleAlaGluIle (SEQ ID NO:66).

8. (Currently amended) ~~The~~ An isolated polypeptide of ~~claim 2~~ selected from the group consisting of PG5: AlaValSerGluIleGlnLeuMetHisGlyGlyGlyGlyGlyLeuAsnSerMetGluArg ValGluTrpLeuArgLysLysLeuGlnAspVal (SEQ ID NO:3), PG9: AlaValSerGluIleGlyGlyGly GlyGlyGlyGlyGlyGlyLeuAsnSerMetGluArgValGluTrpLeuArgLysLysLeuGlnAspVal (SEQ ID NO:5), PG7: AlaValSerGluIleGlnLeuMetHisGlyGlyGlyGlyGlyGlySerMetGluArgVal GluTrpLeuArgLysLysLeuGlnAsnVal (SEQ ID NO:6).

9. (Original) The isolated polypeptide of claim 8 wherein there is a single amino acid substitution.

10. (Currently amended) ~~The~~ An isolated polypeptide of ~~claim 2~~, of the structure or formula S-(L)<sub>n</sub>-B wherein:

- (a) S is X Val X Glu X X X X His (SEQ ID NO: 42), wherein X is an amino acid; ~~and~~
- (b) L is glycine and n equals 5-10 glycine residues; and
- (c) B is a carboxy terminal binding domain of PTH(1-34) or PTHrP(1-34), wherein said carboxy terminal binding domain binds to a PTH-receptor 1 molecule, wherein said polypeptide stimulates intracellular accumulation of cyclic cAMP.

11. (Currently amended)~~The~~ An isolated polypeptide of ~~claim 2~~, of the structure or formula S-(L)<sub>n</sub>-B wherein :

- (a) S is Ser Val Ser Glu Ile Gln Leu Met His (SEQ ID NO: 44);
- (b) L is 5-10 glycine residues; and
- (c) B is Leu Asn Ser Met Glu Arg Val Glu Trp Leu Arg Lys Lys Leu Gln Asp Val (SEQ ID NO: 45).

12. Cancelled.

13. Cancelled.

14. (Currently amended) ~~The~~ An isolated polypeptide of ~~claim 2~~, encoded by a nucleic acid sequence selected from the group consisting of: SEQ ID NO:14, SEQ ID NO:15 and SEQ ID NO:16.

15. (Withdrawn) An isolated nucleic acid sequence encoding the polypeptide of any one of claims 2-13.

16. (Withdrawn) An isolated polypeptide of the structure of formula  $R_1-S-(L)_n-R$ , or  $S-(L)_n-R$  wherein:

- (a)  $R_1$  is the PTH-1 receptor signal sequence;
- (b) S is an amino-terminal ligand signaling peptide;
- (c) L is a linker molecule present n times, where n is a positive integer 1-10, most preferably 4; and
- (d) R is PTH-1 receptor sequence or a portion of the receptor sequence.

17. (Withdrawn) The isolated polypeptide of claim 16, wherein  $R_1$  is the PTH-1 receptor(1-25) peptide, S is the PTH(1-9) peptide, L is Gly, wherein N is 4; and R is the PTH-1 receptor (182-end).

18. (Withdrawn) The isolated polypeptide of claim 16 having the formula  $S-(L)_n-R$ , wherein the  $R_1$  moiety has been cleaved.

19. (Withdrawn) An isolated nucleic acid sequence encoding the polypeptide of claim 16.

20. (Withdrawn) An isolated polypeptide of the formula S-R, wherein:

- (a) S is an amino-terminal signaling polypeptide; and

(b) R is a carboxy-terminal receptor polypeptide.

21. (Withdrawn) The isolated polypeptide of Claim 20, wherein S is the amino-terminal signaling polypeptide X Val X Glu X X X X His, wherein X is an amino acid.

22. (Withdrawn) An isolated polypeptide comprising a sequence selected from the group the of sequences consisting of SEQ ID NO: 37, SEQ ID NO:39 and SEQ ID NO: 41.

23. (Withdrawn) An isolated nucleic acid sequence encoding a polypeptide sequence of claim 22.

24. (Withdrawn) An isolated nucleic acid sequence selected from the group consisting of SEQ ID NO:36, SEQ ID NO:38 and SEQ ID NO:40.

25. (Withdrawn) An isolated nucleic acid sequence, wherein said sequence is at least 95% identical to or binds under stringent conditions to a sequence of claim 24.

26. (Withdrawn) A recombinant vector comprising a nucleic acid sequence of claim 15

27. (Withdrawn) A recombinant host cell comprising the DNA of claim 26.

28. (Withdrawn) A recombinant vector comprising a nucleic acid sequence of claim 23.

29. (Withdrawn) A recombinant host cell comprising the DNA of claim 28.

30. (Withdrawn) A method for treating mammalian conditions characterized by decreases in bone mass, wherein said method comprises administering to a subject in need thereof an effective bone mass-increasing amount of the polypeptide of any one of claims 2, 16 or 20.

31. (Withdrawn) A method for determining rates of bone reformation, bone resorption and/or bone remodeling comprising administering to a patient an effective amount of a

polypeptide of any one of claims 2, 20 or 40 and determining the uptake of said peptide into the bone of said patient.

32. (Withdrawn) The method of claim 30, wherein said effective bone mass-increasing amount of said peptide is administered by providing to the patient DNA encoding said peptide and expressing said peptide *in vivo*.

33. (Withdrawn) The method of claim 32, wherein the condition to be treated is osteoporosis.

34. (Withdrawn) The method of claim 24, wherein the effective amount of said polypeptide for increasing bone mass is from about 0.01 µg/kg/day to about 1.0 µg/kg/day.

35. (Withdrawn) A method of treating diseases and disorders associated with decreased Tether1 activity comprising administering an effective amount of the polypeptide of any one of claims 2, 20 or 40, or an agonist thereof to a patient in need thereof.

36. (Withdrawn) A method of increasing cAMP in a mammalian cell having PTH-1 receptors, comprising contacting said cell with a sufficient amount of the polypeptide of any one of claims 2, 20 or 40 to increase cAMP.

37. (Cancelled) ~~The isolated polypeptide of claim 2 wherein B is 10-20 amino acids in length.~~

38. (Withdrawn) A method for screening for a peptide or non-peptide PTH agonist comprising:

- (a) binding a polypeptide of claim 16 to a potential agonist; and
- (b) isolating said potential agonist from said polypeptide.

39. (Withdrawn) The method of claim 38, wherein said polypeptide is Tether 1 or rδNt.

40. (Withdrawn) An isolated polypeptide, wherein said polypeptide is obtained by the method of claim 38.

41. (Previously presented) The compound of claim 43, wherein said aliphatic diamine comprises 1 to 6 carbons.

42. (Previously presented) The compound of claim 41, wherein said aliphatic diamine is selected from the group consisting of methylene diamine, ethylene diamine, propylene diamine, tetramethylene diamine, pentamethylene diamine, hexamethylene diamine, tetramethylene diamine (also known as cadaverine), pentamethylene diamine (also known as putrescine and hexamethylene diamine).

43. (Currently amended) A compound of the structure or formula  $S-(L)_n-B$  wherein:

(a) S is ~~an amino terminal signaling functional domain of PTH~~ selected from the group consisting of PTH(1-9) (AlaValSerGluIleGlnLeuMetHis) (SEQ ID NO: 1), PTH(1-5) (AlaValSerGluIle) (SEQ ID NO: 4) or PTH (1-11) (AlaValSerGluIleGlnLeuMetHisAsnLeu) (SEQ ID NO: 46); ;

(b) L is a linker molecule present n times;

(c) n is an integer from 1-9; and

(d) B is a carboxy terminal binding domain of PTH(1-34) or PTHrP(1-34), wherein said carboxy terminal binding domain binds to a PTH- receptor 1 molecule;

wherein said compound stimulates intracellular accumulation of cyclic cAMP;

and

wherein said linker molecule L is an aliphatic diamine.

44. (Previously presented) The isolated polypeptide of claim 7, wherein said polypeptide is modified to improve the solubility, absorption, or biological half-life of said polypeptide and wherein said modification is selected from the group consisting of the addition of C<sub>1-12</sub> alkyl groups, the addition of C<sub>1-12</sub> hydroxyalkyl groups, the addition of acyl groups, and lactam cyclization.

45. (Previously presented) The isolated polypeptide of claim 8, wherein said polypeptide is modified to improve the solubility, absorption, or biological half-life of said polypeptide and wherein said modification is selected from the group consisting of the addition of C<sub>1-12</sub> alkyl groups, the addition of C<sub>1-12</sub> hydroxyalkyl groups, the addition of acyl groups, and lactam cyclization.

46. (Previously presented) The isolated polypeptide of claim 1, wherein n is an integer from 5 to 9.